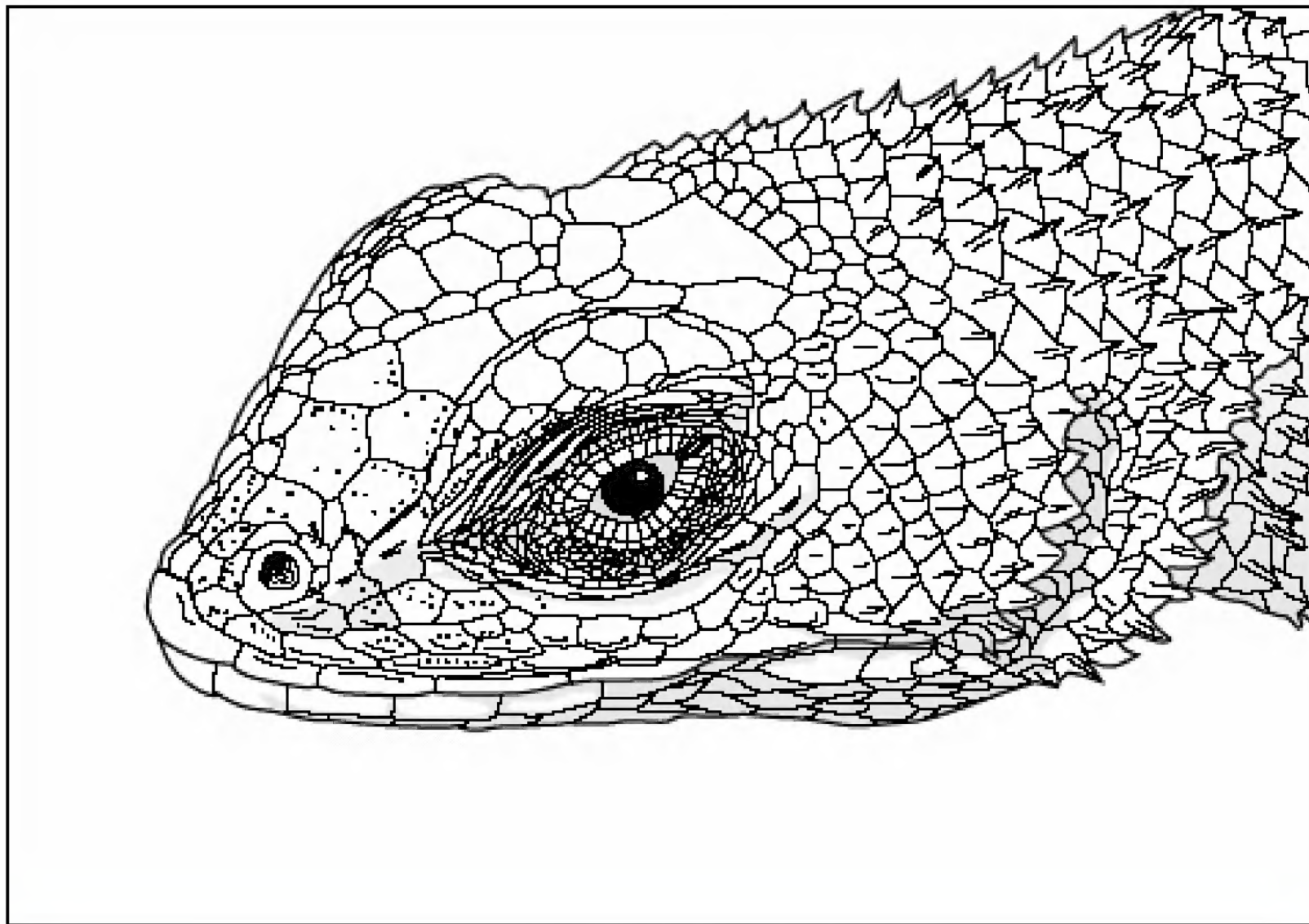

BULLETIN

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BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY

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Will They Come in out of the Cold? Observations of Large Constrictors in Cool and Cold Conditions

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In the winter of 1968, I landed what I considered to be a dream job. I was hired by Mural's Pet Center in Crystal Lake, Illinois, to care for their menagerie. There were fish, birds, rodents, lizards, turtles and frogs. There was a young boa that I stared at, I memorized, I worshipped; eventually it was to become mine, the first snake that my mother allowed in the house.

More exciting, however, was the brooding, dark-natured reticulated python that was housed in the cage next to the boa. The boa was about two feet long; the reticulated python was closer to eight feet and the biggest snake I had ever been near. He was a big-headed, slender, unpleasant snake. He did not hesitate to bite when he had the chance. I was enchanted by him, but I was afraid of him. We all feared him, and the day he was discovered to have escaped from his cage was a day of stressful anticipation.

We searched, cautiously, but we didn't find him. He was a presence in the store for a couple of weeks. Overnight raids on the guinea pigs and hamsters let us know he was there, lurking in the attic by day and roaming the store at night. One cold Saturday morning, we found him in the parking area behind the store. During the night he had left the store through a roof vent, crawled down to the gutter, then down a pipe, and headed back to the alley.

We knew this because there was a fresh eight inches of snow on the ground. We could see exactly where he had been, and how he had arrived at the spot where he was found. He was stretched out in a normal crawling position, breaking a trail through the snow, head up, frozen as hard as a rock.

During the following six years that I lived in northern and central Illinois, I learned of three more occasions when large constrictors left a warm house to die outside in freezing temperatures. In 1971, another reticulated python escaped the same pet store in a manner similar to the first, with similar results. Then there was a young, six-foot Burmese python, and a mature, five-foot Colombian boa constrictor that escaped warm houses to die in snow just feet from the houses.

Burmese Pythons and Cold Temperatures

Skipping forward a few years, the late 1970s were an innovative period for herpetoculture. From my perspective, this was the true advent of captive breeding, brought on, in part, by the discovery of a successful means to "hibernate" snakes in captivity.

In those days, I was employed as a keeper in the Dallas Zoo Department of Herpetology, and I had a large personal collection of snakes as well. My collection was comprised predominantly of kingsnakes and rattlesnakes, all species that hibernated in nature. However, prior to that period of time, there had been a widely accepted belief that it was difficult or impossible to hibernate snakes in captivity.

Snake keepers generally knew snakes could tolerate periods

of cool temperatures, 16°C (60°F) or even 13°C (55°F), but it didn't occur to us that those temperatures WERE hibernation for most captive snakes. Many keepers attempting to replicate "hibernation" had been trying to take their snakes down below 4 or 5°C (40°F), emulating the well-known behavior of ground-hogs and bears. Few snakes survived those attempts.

One of my two snake rooms was kept fairly warm throughout the year, but the other was a back bedroom in which I experimented with low temperatures by opening the large windows that were on two sides of the room. There was a thermostatically controlled gas space heater that kept the room temperatures from dipping too low.

I had Burmese pythons back then; the species had been breeding in my collection since 1974. I had lots of young Burmese pythons around, and I decided to include them in my experiment with cool winter temperatures. I never even considered that Burmese pythons needed to hibernate, or that they hibernated in nature, but I was curious about their reaction to cool and cold temperatures. I also included two Colombian boa constrictors, for similar reasons, but they both suffered respiratory illnesses when I cooled them and I moved them back to my warm room. The pythons proved to be somewhat more resilient.

I thought of this as an experiment, but really it was just observations. I had mercury thermometers in several places around the room and a few in cages; I constantly monitored temperatures and watched what the snakes were doing. Over the course of three winters, I observed some behaviors from my chilled kingsnakes, rattlesnakes and Burmese pythons that today I believe are generally true of most snakes.

One observation was that my snakes began to lose interest in feeding as the environment got colder. Some Burmese pythons quit feeding at 24°C (75°F); others ate at 18°C (65°F), occasionally even down to 17°C (63°F). In general, the young Burmese pythons were more eager to eat at low ambient temperatures than were the kingsnakes and rattlesnakes.

However, a second point I noticed was that the ability to digest and absorb food seemed to be temperature-related; at some point, a cold snake with food inside of it is forced to regurgitate. In general, the larger the meal, the warmer a snake must be to keep it down. Pythons begin to have problems digesting large meals at temperatures below 24°C (75°F); I observed pythons kept at 15°C (60°F) regurgitate rats that had been consumed two weeks previously, decomposed but not digested.

Regurgitation is dangerous to snakes, particularly chilled snakes. I never kept detailed records that would allow me to make accurate estimations, but then and in the years since, I observed that a significant number of snakes that regurgitate develop serious and often fatal respiratory infections a week or two later. This probably occurs because snakes aspirate some of

the fluids that come up with the regurgitations.

As temperatures drop, snakes become less active. At temperatures of 13°C (55°F), most snakes move about slowly, flick their tongues out in slow motion, and will drink water. As temperatures drop further, most snakes become torpid and are unable to move or to react to stimuli.

As temperatures decrease below the point of torpor, there is an increasing chance that when warmed up the snake will suffer cold shock syndrome [CSS]. However, rarely are snakes killed outright when chilled to core-body temperatures of 4–7°C (40–45°F) for only a few hours; if the duration has been short, most will warm up with few, if any ill effects; however, after even a quick chill, some snakes may suffer CSS or other problems upon warming up. At temperatures below 10°C (50°F), pythons suffer an increasing chance of dying as the duration of exposure to cold temperature increases.

When warmed to temperatures where activity is possible, snakes suffering CSS will not be able to move in a coordinated manner. They may exhibit what appear to be violent seizures if disturbed or handled. Snakes with this condition may die within 48 hours of being warmed; if they survive past that period of time, they likely will recover, but full recovery to normal coordinated movement can take more than a year.

It was my observation that Burmese pythons had an increasing chance of suffering CSS as temperatures dropped below 10°C (50°F). The lower the ambient temperature and the longer they are at a low temperature, the more likely they will suffer CSS. Over the years I've seen six Burmese that were kept at 8°C (45°F) for longer than a couple of days, none survived; some died with CSS when they warmed up while others died while cold.

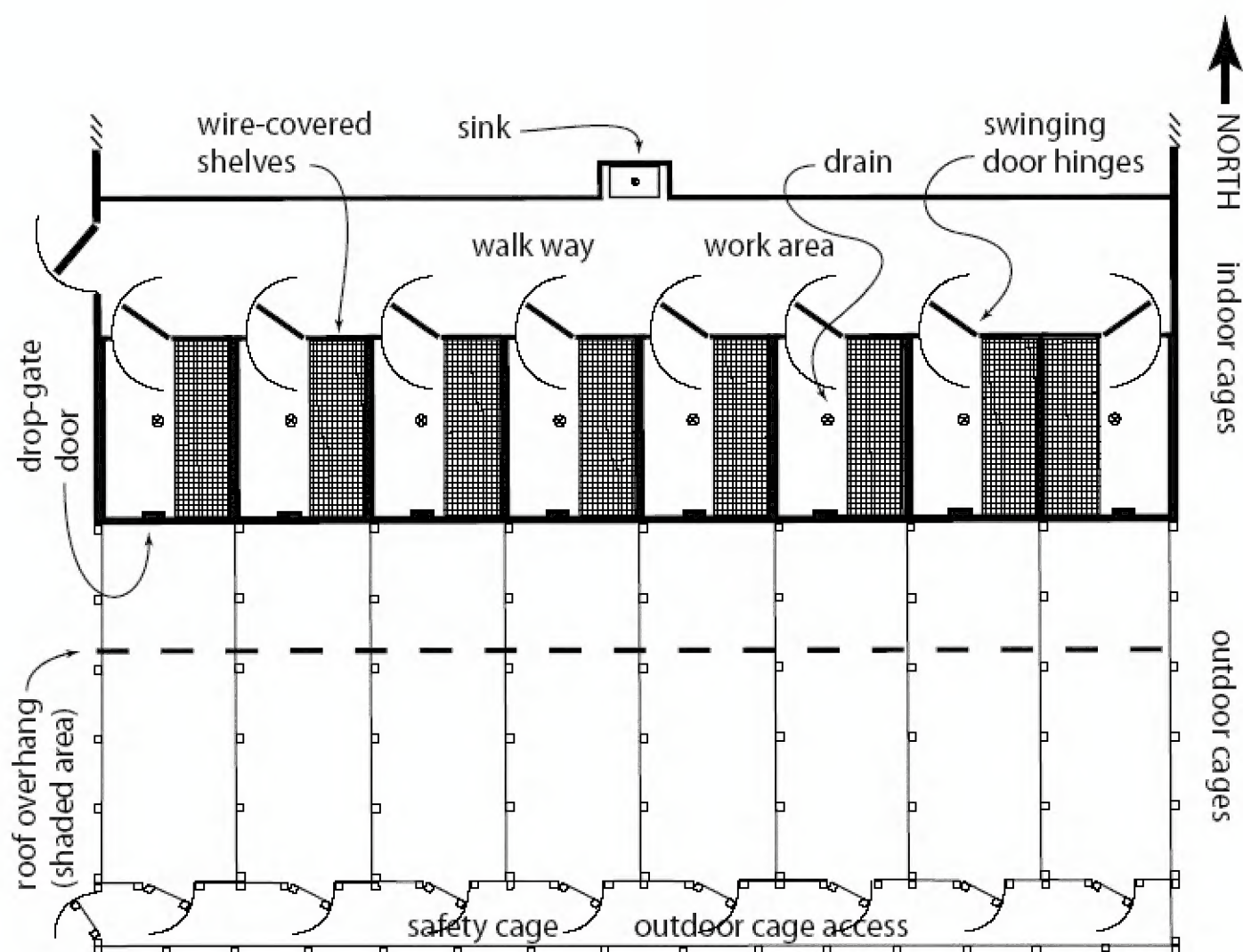
Will They Come in out of the Cold?

Fast forward a few more years. Tracy and I worked with all the largest python species for 11 years, beginning in 1988. During that period of time we experimented with several methods of confinement and housing for the big snakes, some approaching 200 pounds. We worked to evaluate what we felt might be the best way to keep large numbers of large snakes. We placed the greatest emphasis on efficiency of maintenance and on the safety of the keepers of the animals. Our thoughts at the time were that the caging and maintenance protocols that we designed might in the future prove to be valuable if ever there were need to establish large colonies of the largest snakes for conservation or research purposes.

In the winter of 1993, Tracy and I traveled to Australia to research our first *Pythons of the World* volume. There we saw outdoor cages for fruit bats at the Territory Wildlife Park in Berry Springs, Northern Territory. We decided then and there to create a similar cage for the large constrictors we were maintaining at VPI.

We constructed eight cages (see floor plan below), each with climate-controlled, 2.4-m-high indoor rooms that had concrete floors measuring 2 m × 2.3 m. Each indoor cage had two shelves, one above the other, on which snakes could sit; each shelf measured .9 m × 2.3 m.

In the winter we heated the indoor cages using oil-filled electric radiators that were thermostatically controlled to keep the air temperatures at a relatively constant 18°C (65°F). The air was kept moving with oscillating fans, so that temperatures did not stratify. The radiators and fans were placed outside the cages in the walkway that passed in front of all the cages. Each cage had three regulated heating pads, one on the floor



Floor plan and details of the VPI indoor/outdoor cages



The outdoor cages as the wire panels were being assembled. Black PVC-coated, welded wire mesh was used. Each vertical panel sits on a 4-inch-wide concrete beam.

(18°C; 65°F), one on the lower shelf (24°C; 75°F) and on the upper shelf (28°C; 82°F). In the winter, the temperature of the concrete floor during the coldest weather was 13–16°C (55–60°F). Temperatures were monitored with a Raynger non-contact remote-sensing temperature gun.

Each indoor cage connected to a wire-enclosed outdoor run that measured 2 m × 5 m × 2.5 m (h). The substrate of the outdoor enclosures was large smooth river rock. Each enclosure had a large oak log with branches. Access between each indoor and outdoor enclosure was through a small doorway that closed with a vertical drop-gate panel. There was a locked outside access door at the far end of each of the outdoor runs.

Here in the Texas Hill Country we have some winter cold spells, but temperatures on many winter days are suitable for pythons and boas to be outside. Nighttime temperatures, however may dip to dangerous lows; on average there are more than 30 days a year when the daily minimum temperature is $\leq 0^{\circ}\text{C}$ (32°F or colder). Most years include several “blue northers,” each lasting several days. During such periods nighttime lows are -10 to -7°C (14 to 19°F), days are gray and cold, and daytime maximum temperatures may not exceed 0°C (32°F).

From the summer of 1994 through the winter of 1997/1998, we maintained large constrictors in these indoor/outdoor cages. We were excited at the prospect of giving the snakes the option to live inside or outside 24/7, at their discretion. We wanted to know, if given choices, would large constrictors come in out of the cold? We posed the question because it would be an important aspect of the maintenance protocol of large constrictors in this type of enclosure.

Many species of subtropical reptiles and most species of reptiles from strongly seasonal climates are reported to be aware of dangerous low temperatures and react by seeking shelter. Bert Langerwerf had reported success with several large lizard species in indoor/outdoor enclosures in cold Alabama winters. Several turtle keepers told us that some species of tortoises would seek shelter in cold weather. We had seen that some of the larger North American snake species did well year-round in indoor/outdoor cages. If pythons and boas could be counted on to reliably come in from the cold, it would allow them access to their outdoor enclosures during the periods of favorable temper-



The indoor cages all open to a walkway and work area. Using PVC-coated wire shelves was a very good design; the snakes were comfortable on them and they were very easy to keep clean.

atures that are typical of a Texas winter.

It also occurred to us that indoor/outdoor cages might be very effective exhibits for large constrictors maintained in zoos. This type of caging would allow more space to the snakes at less cost, reduce maintenance, and, done correctly, could increase the level of keeper safety when working very large snakes.

I was particularly intrigued with the project, as I had not forgotten the snakes that crawled into snow. I wanted to better understand that phenomenon.

In each cage we propped the drop-gate open and masked most of the opening to create a passageway that was 25 cm × 25 cm. We draped a piece of soft carpet over the opening to block some of the coldest air, creating a “doggy door” for snakes. They readily went in and out of the opening. When we were not supervising the snakes closely, the drop-gate panels could be shut, closing access to the outdoor cages.

When the weather was cold, we checked the snakes at dusk, 10 P.M., sometimes at midnight, and just after dawn. Over the four winters that we watched the snakes, we worked with Burmese pythons (from Thai lineages), reticulated pythons (two from Thailand, one from Borneo, three of unknown provenance), African pythons (from Ghana) and boa constrictors (from Colombia, Peru and Argentina).

Our evaluations of indoor/outdoor cages were positive. The snakes prospered, they reproduced, maintenance was dramatically decreased, and it was possible to safely work with the biggest snakes. However, it became apparent that this would not be an effective way to exhibit snakes in a zoo for the reason that snakes rarely ever went outside voluntarily during daylight hours. From May through mid-October, it was extremely rare to witness any snake in the outdoor cages during daylight hours. In fact, no reticulated python was ever witnessed to go outside in daylight, no matter the time of year.

However, at night all the snakes roamed their outdoor enclosures. They stretched, they prowled, and they climbed on their logs. Often they would emerge at dark, investigate around for a while, and then coil in a hunting position, to remain motionless



Tracy handles one of the reticulated pythons living in the indoor/outdoor cages.

until dawn when they would return indoors.

During the early spring and the late fall, the Burmese pythons and the African pythons would occasionally remain out in the cool mornings until the sun shone strongly on them, then returning indoors.

Pythons in the Cold

During the winter, December through mid-March, we never saw any python go outside in the day. What we observed was that the pythons spent most of the winter sitting indoors on the floor. Most of the winter they maintained body temperatures of 16–18°C (60–65°F), even though warmer temperatures were possible by sitting on the various heating pads. In very cold weather the extended low temperatures and the howling winter winds would overwhelm our heaters, and chill the floor below normal winter temperatures; pythons on the floor would have a body temperature of 10–13°C (50–55°F).

We took most temperatures the quick and easy way, using a RayTech Raynger noncontact temperature gun. In the first year, when the snakes were so cold as to be relatively immobilized, we did take some cloacal temperatures with a mercury thermometer. When the snakes had been sitting in one position for longer than a day, we found close agreement with values registered by the temperature gun for the surface temperature of the snake and for the temperature of the substrate on which the snake was sitting.

At temperatures $\geq 10^{\circ}\text{C}$ (50°F or above) the snakes could voluntarily move. Their big tongues flicked out slowly, and they seemed very deliberate in their movements. Every now and then, each animal would rouse, and change positions, maybe get a drink. Once in a while a python would sit on the coolest heat pad, sometimes for a few days in a row. These big snakes would sometimes remain coiled and motionless for longer than a week. Most movements that we observed were when we happened to encounter a snake getting a drink. They did seem to us to drink fairly often, but there were extended periods when they were not being observed.

Every now and then, a snake would go outside, usually at

night. Sometimes when we checked at night we would find them prowling slowly in the cold air, even below freezing; in those cases we always dragged them back indoors. But sometimes snakes would move in the night after our last check. At the morning check we would find them outside, coiled, at the point of torpor and sometimes completely unable to move. Again, we would drag them indoors and in a short time they had warmed back up.

It appeared to us that their movements to the outside were relatively independent of the temperature. They were about as likely to go outside and coil when it was a fatal -5°C (23°F) or a survivable 16°C (60°F).

All of the large pythons were observed to move outside in dangerously low temperatures — always at night. Twice we found a Burmese python and once an African rock python that were coiled outside after nights with low temps of -4 to -7°C (20–25°F), covered in frost and insensate. We nearly started an autopsy on the first python we discovered in this condition before we realized it was still living. We took cloacal temperatures and found that these chilled snakes had internal temperatures of 4 to 7°C (40–45°F). We pulled the snakes inside and put a 21°C (70°F) soft spray of water on them, and in the period of an hour, all three appeared to recover.

Boas in the Cold

The boas provided an interesting contrast to the pythons. There were six large adult boas housed together in one of the indoor/outdoor enclosures. Two large females were captive-raised Colombian boas (*Boa constrictor imperator*), two large females were captive-raised Peruvian boas (*Boa constrictor constrictor*), and there was a captive-bred pair (male and female) of Argentine boas (*Boa constrictor occidentalis*).

All boas did well in the indoor/outdoor cages during the warm months. However, the boas from Colombia and Peru did not do well when cold weather arrived. Unlike the pythons, they often sat on the middle-level and upper-level heating pads for extended periods of time. They persisted in going outside during the day and at night. Several times we found them cold to the point of torpor. One Peruvian boa came down with a severe respiratory ailment by the middle of December, and by the end of December we felt it in the best interests of the remaining three snakes to remove them to the warm main snake building.

Of all the snakes that we kept in the indoor/outdoor cages, boas and pythons, only the Argentine boas did well in the winter. They never went outside at night, and they never went outside in the day when the weather was unfavorable. They regularly went outside in the winter when they could bask in sunlight. If the weather was calm and clear, they sometimes would emerge from the indoor cage in mid-morning to sit on the dark log or beside the log on the sunny side even when the ambient temperature was as cool as 8°C (46°F). When they were basking, we often measured them with the temp gun to have a surface temperature as much as 12 – 14°C (21–25°F) warmer than the ambient air temperature. They could be warm to the touch even when sitting on rocks that were still cold from

the previous night.

Conclusions

As has often happened, what started out as an investigation of one thing ended up unveiling other revelations more interesting and, perhaps, of greater significance. Tracy and I built the indoor/outdoor cages to investigate their practicality and efficiency as a means to house large colonies of large constrictors. However, in light of the questions currently being raised regarding the possibilities of nonnative boas and pythons becoming established in the continental United States, our observations of the responses of boas and pythons to cold weather seem particularly significant. To our surprise, we can find no previous reports of any similar experimentation that has been done with this particular group of animals.

I publish this account of our observations as an anecdotal report simply because it was not any sort of quantified experiment. However, I consider that our observations are of interest and importance in the matter of ascertaining the risk of any of the large constrictors to become established and invasive.

Based on our observations, we came to the conclusion that large tropical pythons and boas are able to tolerate “uncomfortable cold” and will modify their behaviors accordingly. Undoubtedly, some of the behaviors seen were the metabolic consequences of significantly lower body temperatures—the snakes moved slowly, they moved less, they quit eating. However, we observed that the snakes made conscious decisions on how to react to colder temperatures. The pythons usually chose to not sit on warm heating pads that were always available to them. The boas did sit on the heating pads for extended periods of time, apparently less willing to allow a lower body temperature.

However, based on the behaviors and actions that we observed when the weather was near or below freezing, Tracy and I, much to our keen disappointment, concluded that the pythons and the four tropical boas did not appear to be motivated to seek shelter in an environment of “fatal cold.” They did not appear to us to be able to behave in a manner that reflected the reality that in certain weather conditions it is not an option for a snake

to fail to seek shelter. They were less likely to go outside at night in the winter than in the summer, but in the winter they were as likely to go outside when it was fatally cold as when it was only uncomfortably cold. They did not or could not make the distinction.

In fact, the pythons in the indoor/outdoor enclosures all were descended from tropical populations of animals where freezing weather is unknown. I suggest that the simplest explanation of their apparent inability to shelter from fatally cold temperatures is that such behavior is unnecessary in their native ranges where fatal cold extremes are unknown.

This is in contrast to the behavior of the two large Argentine boas. Even though they were strongly nocturnal during the summer, and spent nearly every night in their outdoor cage, once winter arrived they were not observed to venture outside at night. Even though this particular pair was captive-bred, and had never been outdoors before, they behaved as having strong instincts to shelter from cold extremes.

Argentine boas are a subtropical species found at lower elevations in central northern Argentina from the area of the border with Paraguay south to about 33°S latitude. The climate in the range of the species is moderate and seasonal; there are periods of cold winter temperatures. The species is known to shelter underground in the winter. This is a race of boas that has made morphological and behavioral modifications to live in a temperate climate, a rarity among the larger boa and python species.

Finally, it is my conclusion that the action of a python or boa to seek shelter in response to cold winter temperatures is not an innate behavior common to all species in the families Boidae and Pythonidae. Quite the opposite, it is a rare ability of only a few taxa. It is my observation that those species native to the tropics and other areas where low winter temperatures are unknown have no specific ability to protect themselves from periods of fatal cold.

Acknowledgments

I thank Tracy Barker, my wife, friend and partner.

Note on Reproduction of *Phyllodactylus inaequalis* and *Phyllodactylus microphyllus* (Squamata: Gekkonidae) from Peru

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Abstract

Histological examination of gonadal material from two Peruvian phyllodactylid species of geckos: *P. inaequalis* and *P. microphyllus* from opposite ends of the year (late autumn and late spring) revealed extended reproductive activity in both species with multiple egg clutches of 1–2 eggs. Comparisons are made with the reproductive cycles of other lizards in the genus *Phyllodactylus*.

Species of the gekkonid genus *Phyllodactylus* occur in semiarid to arid regions along the Pacific coast from extreme southwestern California, Baja California and western Mexico through Central America, some Caribbean islands, northern Colombia, northwestern Peru and northern Chile (Dixon, 1973; Savage, 2002). The Peru leaf-toed gecko, *Phyllodactylus inaequalis* occurs in desert foothills of northwestern Peru and may be found in a variety of foothill localities (Dixon and Huey, 1970). It is sympatric with *Phyllodactylus kofordi* and *P. reissii* but is separated by frequenting different microhabitats (Dixon and Huey, 1970). The central leaf-toed gecko, *Phyllodactylus microphyllus* is generally restricted to sandy areas of the Sechura Desert, beaches of the Peruvian coast and offshore islands (Dixon and Huey, 1970). Reports of clutch sizes from both species are in Dixon and Huey (1970). This note reports additional information on *P. inaequalis* and *P. microphyllus*: clutch sizes, evidence of multiple clutches in the same year, and the first information on the testicular cycles.

I examined specimens of *Phyllodactylus inaequalis* from Peru deposited in the herpetology collection of the Natural History Museum of Los Angeles County (LACM), Los Angeles, California. The 20 specimens comprised 12 females (mean snout–vent length [SVL] = 38.8 mm ± 2.2 SD, range = 34–43 mm), 6 males (mean SVL = 36.5 mm ± 2.6 SD, range = 33–40 mm) and two presumed neonates (mean SVL = 20.0 mm ± 1.4 SD, range = 19–21 mm). Voucher numbers are: *Phyllodactylus inaequalis*: Lambayeque Department: LACM 48500, 48505, 48508–48513, 48515, 48516, 48518, 123057, 123058, 123060, 123062, 123063, La Libertad Department: LACM 48495–48497, 48499. *Phyllodactylus inaequalis* were collected November–December 1968 and May–June 1976.

I also examined specimens of *Phyllodactylus microphyllus* from Peru deposited in LACM. The 22 specimens comprised 10 females (mean SVL = 45.0 mm ± 5.1 SD, range = 37–53 mm), 3 subadult females (mean SVL = 31.0 mm ± 4.4 SD, range = 26–34 mm), 8 males (mean SVL = 43.8 ± 7.7, range = 30–53 mm) and 1 presumed neonate (SVL = 22 mm). Voucher numbers are: *Phyllodactylus microphyllus*: Ancash Department: 48590, 123046–123051, 123053, 123055, 123056, La Libertad Department: LACM 48574, Lima Department: LACM 48567, 48569, 48570, 48572, Piura Department: LACM 48577, 48578, 48580, 48584–48586, 48588. *Phyllodactylus microphyllus* were collected in November–December 1968 and May–June 1976.

For histological examination, the left testis and epididymis were removed from males and the stages in the testicular cycle were identified. In several cases the testes were unavailable for examination, but the epididymides were intact. All epididymides were enlarged and contained sperm (*P. inaequalis* LACM 48500, 48508, 123060, *P. microphyllus* LACM 48570, 123053). These lizards were therefore classified as undergoing spermiogenesis. The left ovary was removed from females for histological examination to check for early yolk deposition (occurrence of basophilic vitellogenic granules). Enlarged follicles (> 4 mm diameter) or oviductal eggs were counted. Three *P. microphyllus* females (LACM 48577, 48578, 48580, SVL = 26, 33, 34, respectively) contained “tiny ovaries” and were considered subadults. No histology was done on their ovaries. Tissues were embedded in paraffin and cut into sections at 5 µm. Slides were stained with Harris hematoxylin followed by eosin counterstain (Presnell and Schreiber, 1997). An unpaired *t*-test was used to compare male versus female *P. inaequalis* and *P. microphyllus* mean body sizes (Instat vers. 3.0b, Graphpad Software, San Diego, CA).

Both species, *P. inaequalis* and *P. microphyllus* appeared to exhibit prolonged reproductive cycles in which males underwent sperm formation (= spermiogenesis) in late spring (November–December) and late autumn (May–June) (Southern Hemisphere). The epididymis of all examined specimens contained sperm. The smallest reproductively active male *P. inaequalis* (LACM 123060) measured 33 mm SVL (sperm in epididymis) and was from 4–5 June 1976. The smallest reproductively active male *P. microphyllus* (spermiogenesis in progress) measured 30 mm and was from 6 June 1976.

There was no significant size difference between male and

Table 1. Monthly stages in the ovarian cycle of 12 *Phyllodactylus inaequalis* from Peru.

Month	<i>n</i>	No yolk deposition	Early yolk deposition	Follicles > 4 mm	Oviductal eggs
November	1	0	0	0	1
December	9	1	0	3	5*
June	2	0	0	0	2

* Contained one oviductal egg and concomitant yolk deposition for a subsequent clutch.

Table 2 . Monthly stages in the ovarian cycle of 10 *Phyllodactylus microphyllus* from Peru.

Month	<i>n</i>	No yolk deposition	Early yolk deposition	Follicles > 4 mm	Oviductal eggs
November	3	2	0	1	0
December	2	0	0	1	1*
May	4	0	1	2	1
June	1	0	0	1	0

* Contained one oviductal egg and concomitant yolk deposition for a subsequent clutch.

female mean body sizes (SVL) of *P. inaequalis* (unpaired *t*-test, $t = 1.92$, $df = 16$, $P = 0.07$). Females of *P. inaequalis* were reproductively active in November, December and June (Table 1). The smallest reproductively active female *P. inaequalis* (LACM 123062) measured 34 mm SVL, contained one oviductal egg and was from 4-5 June 1976. One December female (LACM 48516) contained 1 enlarged follicle (> 4 mm) and was undergoing concomitant yolk deposition in the left ovary for a subsequent clutch indicating multiple clutches can be produced in the same year. Mean clutch size ($n = 11$) was 1.1 ± 0.3 SD, range = 1–2. One presumably neonate *P. inaequalis* (LACM 48499, SVL = 19 mm) was collected 18 November 1968; another (LACM 48511, SVL = 21 mm) was collected on 8 December 1968.

There was no significant size difference between male and female mean body sizes (SVL) of *P. microphyllus* (unpaired *t*-test, $t = 0.41$, $df = 16$, $P = 0.68$). Females of *P. microphyllus* were reproductively active November–December and May–June (Table 2). Mean clutch size ($n = 7$) was 1.4 ± 0.5 SD, range = 1–2. The smallest reproductively active female (1 follicle > 4

mm) *P. microphyllus* (LACM 123055) measured 38 mm and was collected 6 June 1976. One reproductively active female *P. microphyllus* from December with 2 oviductal eggs (LACM 48585) was also undergoing concomitant yolk deposition for a subsequent egg clutch indicating two clutches may be produced in the same year. One presumably neonate *P. microphyllus* (LACM 48588) (SVL = 22 mm) was collected 4 December 1968.

While there are not enough monthly samples to completely characterize the reproductive cycles of *P. inaequalis* and *P. microphyllus*, the presence of reproductive activity in late spring (December) and late autumn (June) suggests prolonged reproductive cycles and production of multiple egg clutches in the same year with 1–2 eggs per clutch. Both right and left oviducts were utilized. The collection of probable neonates of both species in late spring may suggest egg laying commences in early spring.

The above reproductive data suggest a prolonged reproductive cycle as reported for *P. reissii* by Goldberg (2007) and other phyllodactylid species: *P. muralis*, *P. tuberculosus* and *P. lanei* from Mexico (Dixon, 1964; Ramirez-Sandoval et al., 2006) and *P. kofordi* from Peru (Dixon and Huey, 1970). However, in contrast, Goldberg (1997) reported that *Phyllodactylus xanti* from southern California exhibited a “typical temperate” reproductive cycle in which spermiogenesis occurred in spring, regression in summer and recrudescence (= recovery) took place in autumn. This indicates variations in the timing of the reproductive cycles of *Phyllodactylus* species from different areas.

Acknowledgments

I thank Christine Thacker (LACM) for permission to examine lizards. Sean Kark (Whittier College) prepared the histology slides.

Literature Cited

Dixon, J. R. 1964. The systematics and distribution of lizards of the genus *Phyllodactylus* in North and Central America. New Mexico State University Scientific Bulletin 64-1:1-139.

———. 1973. *Phyllodactylus* Gray. Leaf-toed geckos. Catalogue of American Amphibians and Reptiles: 141.1-141.2.

Dixon, J. R., and R. B. Huey. 1970. Systematics of the lizards of the gekkonid genus *Phyllodactylus* of mainland South America. Los Angeles Country Museum, Contributions in Science 192:1-78.

Goldberg, S. R. 1997. *Phyllodactylus xanti* (Leaf-toed Gecko). Reproduction. Herpetological Review 28:152-153.

———. 2007. Notes on reproduction of Peters’ leaf-toed gecko, *Phyllodactylus reissii* (Squamata, Gekkonidae), from Peru. Phyllomedusa 6:147-150.

Presnell, J. K., and M. P. Schreibman. 1997. Humason’s animal tissue techniques, 5th ed. Baltimore: The Johns Hopkins University Press.

Ramirez-Sandoval, E., A. Ramirez-Bautista and L. J. Vitt. 2006. Reproduction in the lizard *Phyllodactylus lanei* (Squamata: Gekkonidae) from the Pacific Coast of Mexico. Copeia 2006(1):1-9.

Savage, J. M. 2002. The amphibians and reptiles of Costa Rica: A herpetofauna between two continents, between two seas. Chicago: University of Chicago Press.

What You Missed at the May CHS Meeting

John Archer
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You're a senior in college, nearly ready to graduate, when your professor mentions a job posting involving a survey of herps in a national park. Because you have been involved with herps since you were three years old and have been publishing papers since you were in high school and spent most of your years at North Carolina State working with herps at the Carolina Sandhills National Wildlife Refuge, you have to be interested. The fact that it's in China, involves four months of camping in the wilderness and doesn't pay anything doesn't deter you, but fluency in Mandarin is a requisite because where you're going, few people speak English. You study with a tutor for three months. Two days after you graduate in 2006, you're on a plane to Beijing.

Are kids just more confident these days? I'm not at all sure I'd easily handle that challenge at my present age, let alone when I graduated from college. Kevin Messenger is someone who exudes confidence and seems to be totally without artifice, like a conman or a Nebraska farmer. Kevin is neither. As I shook his hand I thought that I could trust this man with large sums of money, the lives of my children, or the location of my favorite herping spot. Well, maybe not the last. But as you talk with him, it's easy to tell, in spite of his age, that he has the capabilities required to handle this job. "Mandarin is an easy language to learn! It's only got four tones and no grammar!" He didn't say that arrogantly, he said it as if he were trying to convince you that learning Mandarin Chinese is no big deal. Camping for four months in the mountains of central China is fun. And you get to chase herps, some of which are venomous.

Kevin's talk was titled "Herpetofauna of Shennongjia National Nature Reserve, Hubei Province, China." The reserve was established in 1982, covers 800,000 acres, and has elevations ranging from 1,200 feet (400 m) to 10,000 feet (3,000 m). He was to be the second westerner to study the area, and the first to survey it for herps. Kevin opened with maps of the province and gave us an impression of the terrain with slides from Google Earth and photographs. Like many of our speakers, he's a really good photographer, and we were soon convinced that little or no flat land existed within the bounds of the reserve. We were also convinced that it was beautiful, a place any of us would want to camp. As happened, Kevin stayed in station houses and hotels for most of the trip. He worked hard at making a responsible survey, and described for us his methods and results. He documented twenty species of snakes, eight species of lizards, twelve species of anurans, and two species of salamanders. And he did this mostly while walking habitat, repeatedly calming an assistant who was afraid of snakes, and often grabbing animals when his alcohol level was highly elevated by the frequent toasts his hosts insisted upon.

We were shown orange and black snakes (*Dinodon rufozonatum*), Taiwan beauty snakes (*Elaphe taeniura*) with their black on greenish yellow, the bold colors of the unmistakable Mandarin ratsnake (*Elaphe mandarina*), the gold and black bamboo ratsnake (*Elaphe porphyracea*) with two nice red

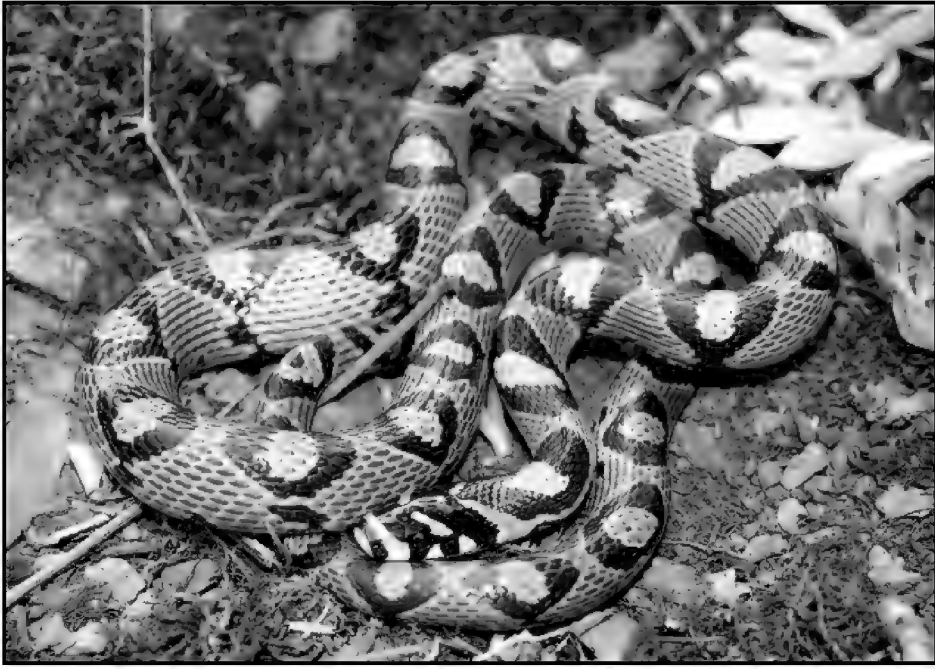


Kevin Messenger at the May CHS meeting, with his PowerPoint presentation showing on the screen behind him. Photograph by Dick Buchholz.

racings-stripes, *Rhabdophis nuchalis* that exude from glands along their bright red necks the poison collected from the toads they consume, two mating kukri snakes (*Oligodon ningshaanensis*), the female of which layed eggs while in a bag in Kevin's hotel room. They hatched before he left, and he returned them to the reserve. The king ratsnake (*Elaphe carinata*) was featured, looking like a bullsnake dressed in bright Florida kingsnake colors. He had pictures of sharp-nosed vipers (*Deinagkistrodon acutus*) in the wild and curled dead in jars from which the locals drank alcohol. Two Fea's vipers (*Azemiops feae*) were shown, but both were DOR. He had pictures of lizards that looked like skinks and lizards that resembled fence lizards, frogs that looked like wood frogs and toads looking like toads. Some of the frogs couldn't be identified until he returned to the States and had access to better guidebooks. Some he has still not positively identified. And he discovered a salamander that looks like nothing in the books. It may be a new species, or simply morphological variants of the salamander he found in his guides. He finished his talk with the complications of his survey. He



Kevin in China, dealing with some attitude from a king ratsnake, *Elaphe carinata*.



Mandarin ratsnake (*Elaphe mandarina*).



King ratsnake (*Elaphe carinata*).



Gecko japonicus. The only gecko Kevin found in the reserve.



Kukri snake love (*Oligodon ningshaanensis*).



Sharp-nosed pitviper (*Deinagkistrodon acutus*) contributing to a tasty alcoholic beverage the locals enjoyed drinking.



Sharp-nosed pitviper (*Deinagkistrodon acutus*), the way most herpers would prefer to see it.

was unable to road cruise, unable to set out cover boards, could find no existing trash or artificial cover, had only a short time at each survey station, and could not survey any elevation throughout all seasons. He's going back July of this year.

As always, I am frustrated with my inability to convey to you the quality of the presentation. During the questioning period Kevin brought in more of the culture he experienced, much of it involving food and drink. But my frustration is somewhat mollified because I can give you guidance toward a better version of Kevin's talk than I can possibly write. I first learned about Kevin when Jason Hood recommended on the CHS forum that we read about this guy's trip to China. Jason has posted links on our forum (<http://www.chicagoherp.org/forum/>) to all nineteen of Kevin's posts on the Field Herp Forum, a forum featuring some spectacular photography and some interesting writing that is well worth visiting. Kevin's posts have amazing photographs of his four-month trip, but take the time to read the writing. Kevin's a much better scribe than I, and I can assure you that once you've read the first post, you'll have a difficult time not reading the rest. They take a while to download and there are nineteen of them, but you'll be happy you spent the time. You'll have a better understanding of the country, the animals, and the people of that area of China, and you'll have a better understanding of Kevin. I can't wait for the posts from



One of the harmless snakes Kevin found most frequently. This large-eyed mountain keelback (*Pseudoxenodon macrops*), gives a convincing imitation of a cobra.

his next trip.

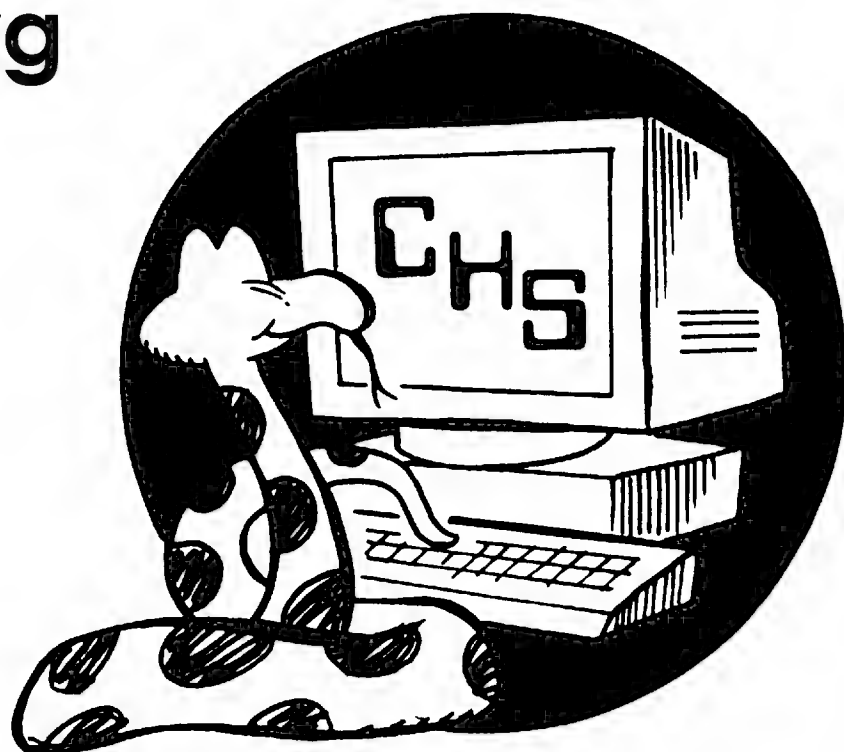
But if you really want to learn interesting things and meet interesting people, attend the meetings, meet the speakers and have dinner with them after the meeting. Our speakers, like our members, approach these animals from many different directions, and there's always something fascinating to learn.

Next time you surf the WorldWide Web, crawl, run, slither, slide, jump, or hop over to the CHS web site!

www.chicagoherp.org

You'll find:

- **Announcements**
- **CHS animal adoption service**
- **CHS events calendar & information**
- **Herp news**
- **Herp links**
- **Meeting/guest speaker information**
- **Photos of Illinois amphibians & reptiles**
- **Much, much more!**



Chicagoherp.org is accepting applications for banner advertisements or links from herpetoculturists and manufacturers of herp-related products. Visit the site and contact the webmaster for details on how you can sponsor CHS!

Unofficial Minutes of the CHS Board Meeting, May 16, 2008

The meeting was called to order at 7:34 P.M. at the Schaumburg Public Library. Board member Jenny Vollman was absent.

Officers' Reports

Recording Secretary: Cindy Rampacek read the minutes from the April board meeting and they were accepted as read. Cindy also confirmed that the edits made to the March minutes were also acceptable to the board.

Treasurer: Andy Malawy ran through the April financial reports and no questions were raised. ReptileFest income was a record for us and we should have a final tally next month as all known bills are now submitted. It was also noted that the tablecloth expense does cover a three-year show period..

Membership Secretary: Mike Dloogatch explained that we will show a loss of impulse members from people who joined at last year's 'Fest. Names of expired memberships were shared.

Vice-president: Jason Hood reported that we currently have speakers scheduled for every month this year but July.

Corresponding Secretary: Deb Krohn reported that a woman called trying to locate the reptile ownership laws for Glenview. A rabbit breeder called in regard to selling to CHS members. Deb strongly suggests watching "The Chances of the World Changing," a PBS documentary (available through Netflix) that involves some of our members.

Sergeant-at-arms: Dan Bavarsha reported that there were 66 at the April General meeting.

Committee Reports

Shows:

- Peggy Notebaert shows are scheduled for the first weekend of every month except for July, when it will be the 12th and 13th. We are scheduled through November 2008.
- The Museum of Science and Industry Members' Night is Wednesday, June 18.

Adoptions: Linda Malawy mentioned that there has been a great increase in red-eared slider calls this month. A woman is willing to donate the remaining caging from her expired iguana.

Old Business

Symposium 2009 : The committee is currently working on hotels. We have a good lead on one in Naperville. We are also looking at following Eric's lead and offering sponsorship.

Earthshare of Illinois Grant application: The CHS was rejected, but they did offer our organization membership.

CHS Grants: Mike Dloogatch and Amy Sullivan are still working on it and will have it all ready for the new website launch.

Trailer/Storage: We still need to acquire an inventory of what CHS materials people are storing in their basements. No further progress will take place on this until we have an inventory.

Website: Our new website will be launched shortly. Final

touches are being made and we can expect a launch before the end of summer.

Wildlife Discovery Center Field trip: We should have a great turnout. The event is a pot luck picnic event with access to grills. Jason looks forward to seeing everyone there.

New Business

CHS business cards: Cindy Rampacek moved to allocate the funding needed to for John Archer to up to \$300 for an initial purchase of business-card-size invitations to attend a CHS meeting. Dan Bavarsha seconded the motion. All present voted in favor of the motion. John will supply pricing to board with and without maps on the back.

Media communications course: John Archer would like to take a media communication training course. Mike Dloogatch moved that the CHS send John Archer to the Making Media Connections, Community Media Workshop being held at Columbia College on June 11. All present voted in favor of the motion.

Portable signs: John would like to see us purchase three roll-up signs. He will get some artwork prepared

National Reptile Association: Jeff Barringer of Kingsnake.com contacted the CHS as to interest in a national reptile organization. The CHS will contact Jeff in regards to this.

Ghann's discount: Aaron LaForge will look into getting cricket discounts for CHS members.

Giant snake measurements: A member of Paul Sereno's staff is working on recreating a scale model of extinct giant snakes. If you have a large snake in your personal collection, please contact John Archer if you are willing to help with measurements.

Cindy Rampacek made motion to send the amount in the cyclura fund and an additional amount from the general fund in the amount of \$500 to Blue Iguana Recovery Programme to help with the effort after the attacks at the QE II Botanical Gardens. Mike Dloogatch seconded the motion and all voted in favor.

Round Table

While herping in southern Illinois on May 1, Mike Dloogatch and Jason Hood ran into a group of herpers who were getting ready to move on to this year's Herpetological Weekend. This event is held each year the first weekend in May at the lodge of the Natural Bridge State Park in Slade, Kentucky. Mike passed around the agenda from this year's Weekend.

Nancy Kloskowski wondered if anyone was interested in being a historian for the society.

Deb wondered if anyone else noticed pre-quake China photos in the press of frogs leaving area en masse. Also she wanted to know if everyone looked at YouTube videos from 'Fest 2008.

The meeting adjourned at 9:36 P.M.

Respectfully submitted by recording secretary Cindy Rampacek

Herpetology 2008

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

TIBETAN HOT-SPRING SNAKE

T. Dorge et al. [2007, The Herpetological Bulletin (101):8-12] note that *Thermophis baileyi* (Wall, 1907) is a small montane colubrid snake, endemic to the Tibetan Plateau with unknown distribution. The species has previously been recorded from only three sites. The aim of this study was to provide new records and to gather the baseline information on ecology and biogeography necessary to understand its origin and evolutionary history. Data were collected on several expeditions between 1999 and 2006 in Tibet (A.R., China). The authors surveyed selected locations that offered suitable habitat conditions for *T. baileyi* and determined every position using GPS. A map of hot-spring distribution on the plateau was then superimposed on these records. Thirteen new localities are reported for *T. baileyi*, which is known only from hot-spring areas and has probably the highest altitudinal distribution among all reptiles, ranging from 3600 to 4900 m asl. The new localities extend the known range of the species considerably. Although *T. baileyi* is rare in Tibet as a whole, it seems locally common at selective sites; these populations may be relatively small and isolated. The authors infer that *T. baileyi* found glacial refugia in hot-spring locations during the uplift of the Tibetan Plateau and cooler periods of the ice ages. Owing to the availability of suitable habitats and high density of hot springs in China, a more extensive distribution in Sichuan and even in the northern parts of Yunnan seems likely. Because of its restricted wider distribution, and specific habitat preferences, the authors emphasize the need for populational and phylogenetic studies on *T. baileyi*, particularly with respect to continuing habitat destruction in the region.

OXYTOCIN DOSAGE IN TURTLES

J. K. Tucker et al. [2007, Chelonian Conservation and Biology 6(2):321-324] experimentally determined oxytocin dosage for the red-eared slider (*Trachemys scripta elegans*). Five dosages including 20, 10, 5, 4, and 2 units/kg were experimentally compared in 253 female turtles in a series of experiments conducted in 1999 and 2000. The three highest doses were equally effective overall following a maximum of 2 injections. The two lower doses were equally effective overall following a maximum of 2 injections. Success rate (i.e., turtles laid all eggs or retained two or fewer eggs following a maximum of two injections) ranged from 100% (20 and 10 unit/kg doses) to an average of 88.9% for the lowest doses (4 and 2 units/kg). When reduction in oxytocin exposure is desired, the lower dosages are recommended; when turtles are being treated for egg retention, the higher dosages may be more desirable. No difference in oxytocin efficacy was found among three species of chelonians (red-eared slider; stinkpot, *Sternotherus odoratus*; and painted turtle, *Chrysemys picta*) when oxytocin was given at 4 units/kg. No difference in efficacy was found among 2669 red-eared sliders from two collecting areas in west-central Illinois induced with 4 units/kg between 2000 and 2005.

SALMONELLA IN FREE-RANGING TURTLES

J. P. Gaertner et al. [2008, J. Herpetology 42(2):223-231] note that information on the importance of captive turtles as sources of human *Salmonella* infections is well established; however, data on the potential of free-ranging turtles as carriers of salmonellae are scarce and contradictory. The authors combined traditional culture techniques and molecular tools to analyze swabs obtained from the cloacae and from different body parts of captive and free-ranging turtles for salmonellae. Salmonellae were detected in 50% of captive turtles ($N = 10$). A similar percentage of detection (51%) was obtained for salmonellae in free-ranging turtles from the Rio Grande ($N = 80$) with six sites at Big Bend National Park, Texas, and one site at Elephant Butte Reservoir, New Mexico, analyzed. Here, 46% of *Trachemys gaigeae* ($N = 36$), 56% of *Apalone spinifera* ($N = 43$), and the only individual of *Chrysemys picta* were positive for salmonellae. These percentages of detection of salmonellae in turtles were independent of the location of the sampling in the Rio Grande, the species and the gender of the turtles. Although individuals of captive turtles testing positive for salmonellae were generally positive for all body parts tested (i.e., the cloacae, the carapace, the ventral base of the left rear leg, underneath one or more of the claws on the front feet, and the ventral base of the tail), individuals of free-ranging turtles testing positive for salmonellae were often positive for only one or two body parts. These results demonstrate that salmonellae are prevalent in high rates in both captive and free-ranging turtles.

ESCAPE RESPONSES OF CRYPTIC FROGS

W. E. Cooper et al. [2008, Behaviour 145(1):25-38] note that cryptic prey may increase likelihood of being detected if they move. When approached by predators, they must assess probabilities of survival if they remain immobile or attempt escape. Probability of survival is the joint probability of being detected, attacked if detected, and captured if attacked. The authors studied escape responses of several species of cryptic *Craugastor* (= *Eleutherodactylus*) frogs to simulated ground and aerial predators by varying elevation angle of attack. Frogs were predicted to escape more frequently when attacked from higher angles because a predator attacking from above on a trajectory leading directly to the prey is more likely to have detected and be attacking than a predator approaching directly, but horizontally. Frogs approached horizontally rarely jumped. The proportion of frogs that jumped increased as attack angle increased, and the proportion that turned or twitched was greatest for 45° approaches. Distance jumped did not vary among attack angles. Escape was directed away from the object approaching at 45°, but was random with respect to the frog's orientation during vertical approaches. Variation in escape tendency may occur because risk increases as attack angle increases, possibly because risk of being detected from above is greater and/or aerial predators are more efficient.

SYSTEMATICS OF THE RUSSELL'S VIPER COMPLEX

R. S. Thorpe et al. [2007, The Herpetological Journal 17(4): 209-218] note that the Russell's viper complex has a patchy (relict) distribution over large areas of Asia from Pakistan to Taiwan and the Lesser Sunda islands. In many areas it is the primary cause of snakebite mortality, and hence a serious medical problem. A multigene mitochondrial gene tree, supported by multivariate morphometry and basic color pattern, suggests a primary split in the organismal phylogeny giving distinct, diagnosable, eastern and western forms that the authors recognize as full species: *Daboia russelii* (west of the Bay of Bengal) and *Daboia siamensis* (east of the Bay of Bengal). The clinical symptoms of human envenoming show marked geographic variations that are broadly unrelated to the phylogeny. The molecular phylogeny, together with current distribution and fossil record, suggests cycles of extreme expansion and contraction for this complex. Further studies on venom variation, diet and local population phylogeny are required, but the local and regional variation in symptoms may be the result of fixation of venom genes during cyclical bottlenecks which could explain the haphazard, non-phylogenetic pattern of symptoms of envenomation in this species complex.

SALINITY AND SPAWNING SITE SELECTION

T. Haramura [2008, Copeia 2008(1):64-67] notes that spawning site selection can strongly influence egg survival and the distribution patterns of species. Coastal areas are risky environments for breeding amphibians because egg survival rates fall drastically with increased salinity. The working hypothesis of the study was that *Buergeria japonica*, a rhacophorid frog inhabiting beach in coastal areas, avoids spawning sites with high salinity. The experiment tested whether females of *B. japonica* select oviposition sites based on salinity levels. Amplexed pairs were collected in the field and introduced into a container with dishes as potential spawning sites, two with pure water and two with water of various salinities. With one exception, females laid significantly more eggs in pure water than in salinities greater than 1%. Female *B. japonica* have an ability to distinguish salinity levels when laying eggs. Spawning site selection based on salinity seems to be important for frog species distributing in coastal areas to reduce egg mortality.

SNAKE DETECTABILITY

G. Moreno-Rueda and J. M. Pleguezuelos [2007, The Herpetological Journal 17(3):204-207] analyzed over a 26-year period the relationship between temperature and rates of detection of the Mediterranean snake *Malpolon monspessulanus* (Montpellier snake) in the wild. The authors used records of live and freshly road-killed snakes in southeastern Spain. A short-term effect of temperature on rates of snake detection was found: the higher the yearly temperature, the higher the snake detectability was that year. Moreover, a long-term effect of temperature on snake detectability was found, as snake abundance in year x was also strongly affected by temperature during years $x - 1$ and $x - 2$. A multiple-regression model demonstrated that these effects were independent. These long-term effects are probably due to an effect of temperature on snake population dynamics.

YOLK USAGE BY HATCHLING TURTLES

T. N. Lee et al. [2007, J. Herpetology 41(3):492-500] note that posthatching yolk in oviparous vertebrates is thought to supply the hatchling with energy for a period of time after hatching in habitats that might require fasting. To examine strategies of posthatching energy use in *Apalone mutica*, hatchlings were fed or not fed over periods of nine weeks in 2003 and six weeks in 2004. Mass, plastron length, carapace width and body condition changed during the course of the experiment; all trajectories of change, except carapace width in 2004, differed between fed and unfed hatchlings. Trajectories of fed hatchlings were significantly higher than unfed hatchlings. Fed and unfed hatchlings used internalized yolk at similar rates: 50% of the yolk was depleted by day eight after hatching and 90% by day 27. Metabolic rate (approximately $0.236 \text{ ml CO}_2 \text{ h}^{-1}$) did not differ between fed and unfed hatchlings. Yolk reserves are insufficient to sustain hatchlings to the first overwintering season, but with access to external forage, hatchlings appear to use yolk reserves to meet maintenance demands to support maximal growth.

TRACKING NEONATE MASSASAUGAS

B. C. Jellen and M. J. Kowalski [2007, Copeia 2007(4):994-1000] note that throughout the geographic range, adult eastern massasaugas (*Sistrurus catenatus*) exhibit plasticity in movement, fecundity, diet and activity range size; however, the ecology of subadults remains unknown. Radio transmitters were attached to 16 free-ranging neonate *S. catenatus* and their movements and growth were monitored for up to 56 days prior to hibernation. Neonate movement frequency (70%) was consistent with values reported for adults throughout the geographic range, but activity range size (0.36 ha) and mean daily distance moved (5.3 m) were smaller. Males gained significantly more mass than females over the first 50 days, but no difference in length was detected. Neonate *S. catenatus* returned to their general birthing area to overwinter. Because of ontogenetic shifts and differences in the spatial distribution of resources, regionally-specific management plans based on data for all age classes are essential in providing effective conservation measures.

ENDANGERED MUD TURTLE

G. Forero-Medina et al. [2007, Chelonian Conservation and Biology 6(2):163-169] estimated population sizes, densities, structure, and sex ratio of a locally endangered species of mud turtle, *Kinosternon scorpioides albogulare*, on the Caribbean island of San Andrés, Colombia. Population size was estimated at 4343 turtles on the island in 2002, inhabiting both freshwater ponds and mangroves. Densities for the main populations varied from 77 to 254 turtles/ha. The population structure showed that most of the individuals belong to intermediate size classes (110- to 140-mm carapace length) and a few belong to the smaller or larger size classes (<110- or >140-mm carapace length). The sex ratio was significantly different from 1:1 and was skewed toward females, 1 male per 1.97 females. No common use was found for the species among native islanders, although people from the continent living on the island use it for diverse purposes. Some threats were identified, such as mangrove pollution and the presence of the introduced species *Tupinambis teguixin*.

GENETIC CONSIDERATIONS FOR CAPTIVE BREEDING

D. A. Williams and M. F. Osentoski [2007, *Chelonian Conservation and Biology* 6(2):302-313] review the genetic issues that need to be considered when establishing captive breeding colonies of tortoises and turtles for eventual reintroduction or population supplementation. The first section of this review stresses the importance of creating breeding units that are based on the population structure of a species in its native range. The authors discuss how molecular methods and the concepts of evolutionarily significant units (ESUs) can be used to define breeding units for captive breeding colonies and determine their geographic origin for reintroduction. The second section covers the need to maintain the genetic variability of the colony members and the techniques that are available to achieve this goal.

A MOST UNFORTUNATE TANGLE OF NAMES

A. T. Holycross et al. [2008, *Copeia* 2008(2):421-424] re-identify the broad and imprecise type localities of *Crotalinus catenatus* Rafinesque, 1818 (now *Sistrurus catenatus*) and *Crotalinus viridis* Rafinesque, 1818 (now *Crotalus viridis*) based on a published account of the collector's travels as well as an examination of the relationship and contacts between the collector and the author of the type description. Both type specimens are lost. Unfortunately, enhanced resolution of the type locality of *S. catenatus* places it within the range of *S. c. tergeminus* Say, 1823 (a subsequently described subspecies). Thus, the name *S. c. catenatus* incontrovertibly applies to the form currently recognized as *S. c. tergeminus*, which in turn renders the latter as a subjective junior synonym of the former, leaving the eastern form with an unfamiliar name (*Crotalus messasaugus* Kirtland, 1838). To conserve prevailing usage, the authors are preparing an appeal to the International Commission of Zoological Nomenclature (ICZN) to allow a neotype of *Sistrurus catenatus* to be designated from the type locality of *Crotalus massasaugus*. In the interim, existing use of the names should be continued.

FRINGE-TOED LIZARDS IN MEXICO

C. Ballesteros-Barrera et al. [2007, *J. Herpetology* 41(4): 733-740] note that two species of fringe-toed lizards, *Uma exsul* and *Uma paraphygas*, are restricted to small areas of sand dunes in the Chihuahuan Desert, where land cover transformation has increased dramatically in recent years and future climatic changes are expected to be severe. The current geographic distribution of each species was estimated by ecological niche modeling using the Genetic Algorithm for Rule-set Prediction (GARP). A recent land-use map was used to determine areas where habitat has been transformed by human activities, and niche models were projected under two simulated climatic scenarios and for two periods of time (2020 and 2050) to estimate their future potential distributions. Results indicate a high degree of anthropogenic habitat transformation within the distribution of *U. exsul*, and an important reduction of its distribution by 2050. For *U. paraphygas* land cover transformation is less severe, but a complete collapse of its current distributions is expected in the future because of climate change. Despite the uncertainty involved, the general trends seem highly feasible and immediate conservation actions are recommended.

DO CONSPECIFIC CUES AFFECT FOLLICULAR DEVELOPMENT IN THE LEOPARD GECKO?

L. D. LaDage and M. Ferkin [2008, *Behaviour* 145(8): 1027-1039] note that sexually reproducing organisms must process and respond to internal and external stimuli to successfully synchronize physiological and behavioral processes involved in reproduction. One such cue is an individual's social environment. Interactions with conspecifics affect a female's reproductive activity by inducing, suppressing, and/or accelerating reproductive processes. For example, many studies support the theory that the presence of a same-sex conspecific may suppress an animal's reproductive physiology, whereas an opposite-sex conspecific may stimulate an animal's reproductive physiology. This study was to determine whether exposure to a conspecific male or female affects the onset of follicular development in sexually-experienced female leopard geckos (*Eublepharis macularius*). The data show that follicular growth was not affected by whether female geckos were housed next to a male conspecific, a female conspecific, or isolated from conspecifics. In addition, the number of days until the initiation of follicular development of female geckos was not affected by whether the females were housed in the presence of a conspecific or in isolation. The results are discussed within the theoretical framework of the effects of social cues on the reproductive physiology of females and the limited empirical data about such effects in squamate lizards.

BIASED BODY SIZES IN AQUATIC SNAKE CAPTURES

J. D. Willson et al. [2008, *Copeia* 2008(2):401-408] note that ecologists often rely on a suite of demographic parameters—such as age structure, body size distributions, population density, and sex ratios—to understand life history patterns, population dynamics and community structure of snakes. Unfortunately, in many cases little consideration is given to how sampling techniques may influence the outcome of demographic studies. The authors used a combination of field capture techniques, an extensive database of field-captured snakes, and laboratory and field experiments to evaluate how capture methods may influence demographic assessments of several North American semi-aquatic snake species, including *Agkistrodon piscivorus*, *Faranacia abacura*, *Nerodia fasciata*, *N. floridana*, *N. rhombifer*, *N. taxispilota*, *Regina rigida*, *Seminatrix pygaea* and *Thamnophis sauritus*. They found that commercially available aquatic funnel traps (i.e., minnow traps) generally yielded biased assessments of population demography, but that the nature and magnitude of these biases varied predictably by species and trap type. Experimental manipulations of funnel opening diameter in aquatic funnel traps demonstrated that such modifications allowed for capture of larger snakes but that the size of funnel opening necessary to capture the largest individuals varied between species. Additionally, there were differences found between snake species in their ability to escape from different types of traps at birth, suggesting that escape of neonates through trap mesh can lead to the lack of small snakes often observed in field samples. Overall, the results demonstrate that capture methods may bias assessments of snake population demography, but that careful design of sampling methodology, with consideration of potential biases, can yield meaningful data on snake biology.

MOONLIGHT AND BROWN TREESNAKES

S. R. Campbell et al. [2008, J. Herpetology 42(2):246-250] note that microhabitat selection by reptiles can be affected by a complex interplay of abiotic and biotic factors. The brown treesnake (*Boiga irregularis*) is an efficient nocturnal predator that hunts in the tropical forest canopy and on the ground, using visual and chemical cues. To identify the factors influencing brown tree-snake microhabitat use, the authors experimentally manipulated an abiotic factor, moonlight level, and a biotic factor, prey presence. They hypothesized that (1) moonlight would affect microhabitat use and (2) the presence of prey would alter microhabitat use in various moonlight levels. Trials were conducted in a large laboratory chamber with artificial trees in simulated new, half, and full moonlight. In each trial, the snake's location in canopy, subcanopy, or open ground was recorded at 60-sec intervals for 100 min. Treesnake microhabitat use was determined in three moonlight levels without prey present and in two moonlight levels with a mouse (adult *Mus musculus*) or a mangrove monitor (juvenile *Varanus indicus*) present. The treesnakes used open ground areas more as moonlight decreased, and they used the canopy more as moonlight increased. No significant differences existed within a moonlight level between trials with or without prey. Thus, moonlight appeared to supercede prey availability in affecting brown treesnake microhabitat use. Additionally, the effect of nocturnal illumination on brown treesnake habitat use may also have important conservation implications regarding trapping techniques and deterring the snakes from specific areas.

DIET OF THE GOLDEN MANTELLA

C. Woodhead et al. [2007, The Herpetological Journal 17(4): 225-236] studied the diet of a population of free-ranging *Mantella aurantiaca*, an alkaloid-containing poison frog from Madagascar. As in other poison frogs, this species is thought to sequester alkaloids from arthropod prey. Among prey, mites and ants are known to regularly contain alkaloids and mites appear to be a major source of dietary alkaloids in poison frogs. The authors predicted that mites and ants would constitute the most important prey item for these frogs. Prey inventories were obtained during the rainy season by stomach flushing 23 adult male and 42 adult female frogs from one population. Males had smaller body sizes than females and ate smaller prey items, but males and females displayed no differences in the number of prey items consumed. The numerical proportion of ants in most specimens was surprisingly low (11% in males and 15% in females), while mites were slightly more frequent (34% in males and 18% in females). Other prey items consumed in large proportions were flies and collembolans. Comparing the total of 5492 arthropod prey items with 1867 arthropods sampled from the frogs' leaf litter habitat, the proportion of prey classes did not significantly differ among the samples, indicating a low degree of prey electivity in this population. Our data suggest that not all poison frogs exhibit a continuous and active preference for feeding on ants and mites, but instead some may consume high proportions of ants due to a high abundance of ants in their environment.

COMMUNICATION BETWEEN TORRENT FROGS

J.-X. Shen et al. [2008, Nature 453:914-916] note that sound communication plays a vital role in frog reproduction, in which vocal advertisement is generally the domain of males. Females are typically silent, but in a few anuran species they can produce a feeble reciprocal call or rapping sounds during courtship. Males of concave-eared torrent frogs (*Odorrana tormota*), which live in the noisy environment of rushing streams, have previously been shown to employ ultrasonic communication. Although females of *O. tormota* have an unusually well-developed vocal production system, until now it has been unclear whether or not they produce calls or are only passive partners in a communication system dominated by males. The authors report that before ovulation, gravid females of *O. tormota* emit calls that are distinct from males' advertisement calls, having higher fundamental frequencies and harmonics and shorter call duration. In the field and in a quiet, darkened indoor arena, these female calls evoke vocalizations and extraordinarily precise positive phonotaxis (a localization error of $<1^\circ$), rivalling that of vertebrates with the highest localization acuity (barn owls, dolphins, elephants and humans). The localization accuracy of *O. tormota* is remarkable in light of their small head size (interaural distance of <1 cm), and suggests an additional selective advantage of high-frequency hearing beyond the ability to avoid masking by low-frequency background noise.

REPTILE ROAD MORTALITY AROUND AN OASIS IN THE ILLINOIS CORN DESERT

D. B. Shepard et al. [2008, Copeia 2008(2):350-359] note that roads have numerous negative ecological effects on terrestrial fauna, and vehicular mortality can have significant demographic consequences for some species. They studied road mortality of reptiles around Carlyle Lake, Clinton County, Illinois, from April 2000 through November 2002, to assess the impact of vehicular traffic and identify influential factors. Carlyle Lake, a popular tourism/recreation area, is situated in a larger agricultural landscape and is home to the largest Illinois population of the endangered eastern massasauga (*Sistrurus catenatus*). The authors documented 321 cases of reptile road mortality (84 individuals of six turtle species and 237 individuals of nine snake species) while driving their approx. 46-km study route roundtrip daily. Turtle road mortality was highest in May and June, and positively associated with precipitation and minimum daily temperature. Colubrid snake road mortality was highest in April and October, and positively associated with minimum daily temperature. Forty-two cases of road mortality of *S. catenatus* were recorded, with the highest numbers occurring from mid-August to mid-September. Road mortality in *S. catenatus* was biased toward adult males, which show an increase in movement in August, coinciding with the peak of the mating season and a period of high tourist visitation. The traffic intensity on a road segment did not significantly affect the level of road mortality, but segments through high quality habitats had higher levels of mortality than segments through lower quality habitats. Based on the authors' study on the ecology of *S. catenatus*, they make recommendations to reduce road mortality that should aid in the conservation of the Carlyle Lake population.

Advertisements

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail: GrmtRodent@aol.com.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. We feed our colony a nutritionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. Mice starting from: pinks, \$.17 each; fuzzies, \$.24 each; hoppers, \$.30 each; weanling, \$.42; adult, \$.48. Rats: starting with pinks at \$.45 each, to XL at \$1.80 each. Discount prices available. We accept Visa, MC, Discover or money orders. PO Box 85, Alpine TX 79831. Call **toll-free** at (800) 720-0076 or visit our website: <http://www.themousefactory.com>.

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For sale: Graptemys.com T-shirts, 100% cotton, pre-shrunk, pigment-dyed shirts with the Graptemys.com embroidered logo. These are very high quality shirts with that stylish faded look. Sizes S-M-L-XL-XXL. Colors: Pacific blue, nautical red, brick red, plum, granite, khaki green and putty. All profits made from these shirts goes directly to in situ *Graptemys* research. \$20 each with \$3.00 shipping. Email: chris@graptemys.com or call (239) 437-4148 to order. You can look at the shirts at <http://www.graptemys.com/shirts.htm>

For sale: Never used Neodesha glass front cages; eight 24" (\$45 each), nine 36" (\$75 each), & three 48" (\$155 each). All were purchased new from the manufacturer (Bush Herp) just months before they closed down. I originally purchased them for a tortoise breeding project which did not materialize. These are perfect for snakes, lizards, spiders or ?? They all have side vents with doors and front litter/moisture dams. Prices are wholesale cost. I also have new incandescent fixtures for each. Will sell individual units for above prices or all for \$1,200. Bob Krause, 224-875-0090, robertkrause@aol.com Also have various aquariums, new screen covers etc.

For sale: Neodesha cages, with 2' dams. Have four 36" with single piece plate glass and aluminum top guide, asking \$50 ea. Have six 48" with two piece plate glass and aluminum top guide, asking \$120 ea. Never exposed to sunlight. None previously used to house animals. Ben Entwisle, Entwisleassoc@aol.com, (r) 815-838-2871, (o) 815-838-1200, (c) 815-685-2740.

For sale: books. Bridges, William—*Gathering of Animals: An Unconventional History of the New York Zoological Society*, 1974, 518 pp., many historic b&w photos; an interesting read with anecdotes of people like Ditmars, Crandall, Beebe, Hornaday, Fairfield Osborn and other legendary zoo people; DJ with mylar covering, hardbound, \$26; Johnson, Tom R.—*The Amphibians and Reptiles of Missouri*, 368 pp., many color photos, range maps, this is the out-of-print hardcover edition, minor discoloration on lower right corner of front cover, \$60; Brown, David E.—*Vampiro*, 1999, 147 pp., 50 figs. (b&w photos, drawings), a fascinating, comprehensive, authoritative account of the natural history of vampire bats and their interactions with humans throughout history, extensive bibliography, softbound, \$6; Guyer, Craig, and Donnelly, Maureen—*Amphibians and Reptiles of La Selva, Costa Rica and the Caribbean Slope*, 2005, 299 pp., 207 color plates, many figs., an excellent guide to the herpetofauna of La Selva Biological Station and environs, softbound, \$16; Mara, W. P.—*Racers, Whipsnakes, and Indigos*, 1995, 64 pp., illustrated with outstanding color photos of snakes and their habitats, info on natural history, taxonomy and captive husbandry, softbound, \$6. *Australian Snakes and Lizards*, part of Australian Wildlife series, 1981, 51 pp., many good color photos, contains representatives of all 5 Australian lizard families plus snakes, hardbound, \$22; McCoy, Michael—*Reptiles of the Solomon Islands*, 1980, 80 pp., 20 b&w and color plates (photos); distribution, description and ecology of these tropical islands' over 70 species, softbound, \$28. All books in excellent condition except as noted. \$2.50 postage and handling for orders \$25 and under, free for \$25 or more. William R. Turner, 7395 S. Downing Circle W.; Centennial, CO 80122; telephone (303) 795-5128; e-mail: toursbyturner@aol.com.

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Herp tours: **Madagascar—Tortoise Tour & Chameleon Tour** seeking adventurous members for January–February 2009. The goal of the tortoise tour, to be co-led by **Peter Pritchard** of the Chelonian Research Institute and **Bill Love**, will be to see all native species in the wild and record various aspects of their lives photographically. The later chameleon tour, co-led by **Mike Monge** of FL Chams and **Bill Love**, will focus on panther chameleons, trying to find and photograph as many of the color morphs as possible in the wild. Details are at Blue Chameleon Ventures' site at: www.bluechameleon.org.

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, June 25, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. This will be our popular and always well-attended annual **Show & Tell** meeting. Bring an animal that you find interesting for one reason or another and be prepared to give a short (under five minutes) presentation to the group. Don't be shy. Age (yours) or commonness (the animal's) should not be a limitation. Guidelines for the occasion: don't bring venomous reptiles or endangered species, and please bring only amphibians or reptiles (this means no worms, tarantulas or other invertebrates).

At the July 30 meeting, **Dr. Ben J. Williams** of McMaster University in Hamilton, Ontario, Canada, will speak. Dr. Williams has studied the evolution of fanged frogs and Celebes toads on the Indonesian island of Sulawesi, and also the evolution of African clawed frogs.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum — the **Peggy Notebaert Nature Museum**. This beautiful new building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

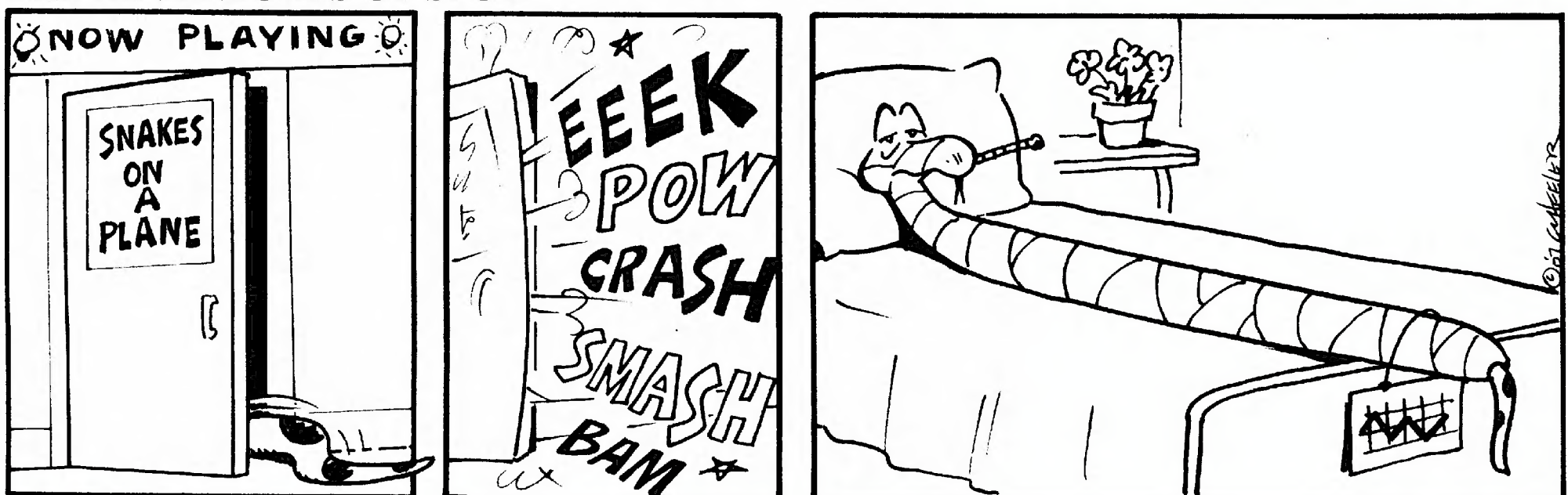
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., July 18, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: <http://www.geocities.com/~chicagoturtle>.

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